

Vol. 6 - N° 8.

April 1993.

FORMAT

FOR SPECTRUM AND SAM USERS

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ISSN 0963-8598.

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FORMAT ISSN 0963-8598.
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FORMAT is published by FORMAT PUBLICATIONS.
34, Bourton Road, Gloucester, GL4 0LE, England.
Telephone 0452-412572. Fax 0452-380890.

Printed by D.S.LITHO. Gloucester. Telephone 0452-523198.

NEWS ON 4

16 BIT DUMPING

Both leading 16 bit computers, the Amiga and the ST now appear to be fighting for sales.

Atari are offering the old STFM machine, dropped in the UK back in 1990, at 159.95. The machines, originally built for the Swedish market have been brought into Britain following the closure of Atari's subsidiary in Sweden. Even the fact that WH Smiths recently stopped selling ST software does not appear to affect Atari's decision.

Meanwhile, SDL - one of the UK's larger distributors is trying to move stocks of the old Amiga 500 at dealer prices designed so that the machine will retail for under 200.

Couple this with the news this month that many of the Amiga magazine have suffered their first set back in sales figures and you could come to believe that people are at last beginning to see through the 16 bit hype.

SU DEPARTS

Way back, when men were men and computers did a lot to warm your house in the winter, Sinclair User was born. A small mag, dedicated to an even smaller computer - the ZX81. But it grew - just as the home computer industry did - like topsy.

Now, I'm sad to say, SU is no more. OK it had lost track of its roots. It was a pale shadow of its former self in those far off heady days of '84-85. But we should all shed a tear and stand in silence for a few moments.

SU was the first high-street mag dedicated to the Sinclair family of computers. It once boasted sales figures of over 80,000 copies per month. For many in our hobby it was a constant companion in those early days of the ZX81 and Spectrum. Let us remember its former glory.

REVELATION MOVES AGAINST COPIER.

Exeter based software company Revelation has fired warning shots across the bows of a software pirate. Illegal copies of its highly successful word-processor, The Secretary, had been traced back to a Bristol school boy who had been giving copies away to SAM users he was in contact with.

Revelation's boss, Frank Broughton, told FORMAT that the boy in question had been traced by the unique 'watermark' recorded on each disc and encoded into each copy of the program. After warnings were issued by Revelation the youth gave a signed undertaking not to repeat his illegal act. In addition a list of those people he sent copies to was provided.

Revelation have written to these illegal users offering them the chance to legitimize their position by buying a legal copy. However, due to the high costs involved in pursuing software theft Revelation say they cannot afford to be so lenient if any future case comes to light.

SKY HIGH HIT.

Satellite television channel Sky One seems to have a hit on its hands. Less than a month after its launch their new electronic games show 'Gamesworld' has taken three out of the top five places in the viewing charts.

During the week ending 21st March three of the weeks five shows averaged 500,000 viewers. Sky's viewing figures are based exclusively on UK surveys and so do not take into account the viewers from the rest of Europe.

URGENT we need your news. Anything you think other people should know about. Items printed earn contributor 3 month extra subscription (please claim when renewing).

The Editor Speaks

Well summer is here, or at least the clocks have gone forward - to be honest I wish they would just leave things on GMT all year, it would save us all adjusting the clocks twice a year. Just think how much good computer time we waste.

Lots going on this month including the sad demise of the grandaddy of all Sinclair mags - Sinclair User. It only seems like yesterday I was attending their rather drunken first birthday celebration - now they are no more...

Still, life must go on, and there is one good thing that has come out of their ending. Without knowing that SU was closing I had booked to run an advert with them to promote the Associate Membership scheme started last year. Well of course, as it turns out to be the last issue, the impact of the advert should turn out to be far greater than it otherwise would have been. It is still too early to tell, but as SU claimed a sales figure of around 30 thousand copies per month, that should produce quite a few new Associate Members - most of which, going on past experience, will end up as full members and therefore FORMAT readers. The same advert will also appear in Your Sinclair over the next few months.

I have been talking to several of our regular advertisers recently and some comments received should be passed on I think. First, When you order something, please mention FORMAT because it allows companies to judge the response of their adverts. If you send for further information then please enclose a stamped addressed envelope - most (if not all) companies involved in the Spectrum and SAM markets these days are running on very tight budgets to provide you with software/hardware at affordable

prices. In the long run all those stamps and envelopes add up to quite a lot of money.

Next, and this is very important - PLEASE WRITE CLEARLY. I know, just from the orders we receive here that there are many people who's writing is very difficult to understand. Never a week goes past without an advertiser ringing up to say "can you give me the address of member so-and-so, 'cos I can't read the address." Brian Gaff of BG Services particularly asked me to comment on this because he suffers from very poor eyesight. If possible type orders on an A4 or A5 piece of paper or if you handwrite at least print clearly. And while I am on the subject of paper size - you should see some of the tiny bits of paper some people try to pen their orders to us on. Do people what us to loose their orders? Please spare a thought for the person who has to handle, interpret and then file your orders.

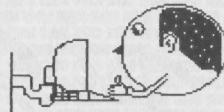
Now back to something a little lighter. Due to many reasons beyond our control we have been rather lax at attending All Formats Shows so far this year. Obviously we can't get to them all anyway - there are far to many. In the past I have told readers to give me a ring a few days before a show and I would confirm if someone was going. Well quite rightly some of you felt that was asking a bit much. So here is a list of the shows FORMAT should be attending in the next couple of months.

Birmingham - 18th April
but not 30th May.
Bristol - 25th April.

Haydock & London are still to be arranged. More details next month.

Bob Brenchley. Editor.

SD Software



UNIDOS Version 2 of the incredible new DOS from Steve Warr for the PLUS D and DISCIPLE. Same DOS file for both systems. Random files. Sub directories. Hundreds of files on one disk. Hidden files. Protected files. Copy files of any length. Incredibly versatile screen dump routines. Error trapping. Many more features. Compatable with all Spectrums*. Over 20 programs now included on the disk. * +2A/+3 restricted to 48K mode.

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SHORT-SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

Hi folks; trouble's back. This month's a good one. I'm behind with work, my wife's hurt her back, and the builders have removed plaster from walls in seven rooms and dug a trench across the lounge floor - insurance remediation of subsidence damage. So let's add to the chaos and get on with Short Spot!

Mr L.G.Baumann of Cowies Hill, South Africa, is well known to many of us as a contributor, and often heads the April column. This April, it's no exception, but for once he's serious. It's a 48k Spectrum item too; and these days I'm short of these.

He writes, "Have you ever DIMensioned an array, filled it with data and later wished it could be made bigger? This is quite easy to do without losing the pre-entered data."

Note:- An array can be LOADED into the computer into a different character from that originally used to SAVE the array.

STRING ARRAY

Assume the array is A\$(100,20) and was already saved as "Filename" DATA A\$(), and you now wish to enlarge it to A\$(111,23). Use the following little program:-

```
10 DIM B$(100,20)
20 LOAD "Filename" DATA B$()
30 DIM A$(111,23)
40 FOR Q=1 TO 100
50 LET A$(Q)=B$(Q)
60 NEXT Q
70 SAVE "Nufilename" DATA A$()
```

and remember to alter the appropriate DIM instruction in your main program before you attempt to reload the enlarged array otherwise you will get an error message.

NUMBER ARRAY

Assume the array is A(50,7) already saved as "Filename" DATA(A), and you wish to enlarge it to A(55,11).

```
20 DIM B(50,7)
30 LOAD "Filename" DATA B()
40 DIM A(55,11)
50 FOR X=1 TO 50: FOR Y=1 TO 7
60 LET A(X,Y)=B(X,Y)
70 NEXT Y; NEXT X
80 SAVE "Nufilename" DATA A()
```

again remembering to alter the DIM instruction in the main program.

Our grateful thanks Mr Baumann.

You know, it has now for some time been a matter of concern to me that eight-bit computers have largely lost street-cred with the kids. I mean that they buy Nintendos or Amigas, and then find them far too complicated to program. So, sadly, the next generation of programmers is just not there. In the old days, machine code programming on the Spectrum, with its Z80 chip led logically to Intel's 8086 and 8088, 80286, 80386 and 80486 chips without too much difficulty.

I was reminded of this a few weeks ago by Mr J.Gobeik of Evesham in conjunction with a small local firm with whom I have had many conversations. They have on several occasions pointed out that SAM has a Z80. Consequently, it will run standard Intel-compatible programs. Well, not really: it's short on memory, and the Z80's short on commands. However, they have developed a board that will fit in the SAMbus which to some extent overcomes these obstacles, provided one has enough memory. Frustration all round was at last sorted out when Bob provided me with a power pack for SAMbus - you

remember the problems I had earlier? Well, I'm glad to report that this has solved them, and the backplane now works perfectly. I've just been beta-testing the latest board and programs, and it's really magic. I've had to chuck my second drive and printer port off temporarily, for the three slots are now filled as follows. The first two boards are standard, each holding a Megabyte of memory; the third is covered with chippery. There are, as far as I can see, at least five more Z80A chips, and a further ASIC: this holds some specialised code compensating for the shortage of commands in the Z80's, code which can substitute for the DOS and new video drivers. The result; I can now run Windows 3.1. Compared with my Desktop 486, it takes an age to load the discs, it's incredibly, tortuously, horribly grinding and slow, but it's there, and it's stable. I've been running my favourite, "Pageplus", and watching the TrueType fonts rise and fall as my mouse commands. Trouble is, at the moment, I can't print them!

Foiproall of Pershore, the firm involved, assure me that they are working on the speed problem, and are also working on a scheme to put the lot on one board, so that I can reinstate my printer port. More details from "Foiproall", 3 Spring Lane, Pershore, Worcs, WR10 2AA, and I'll keep you posted as things progress.

It's an ill wind that blows no-one good. The general upheavals have meant that furniture has been moved from room to room, drawers emptied, cupboards moved. My profuse apologies to Mr E.H.Cooke-Yarborough of Longworth, Abingdon, who wrote exactly 12 months ago, and whose letter clearly slipped from the pile and down the back of the sideboard! Come the removals, and there it is! He writes about two Spectrum topics.

The first is on reading the time from the Spectrum's Frame Counter. He writes that In Short Spot for February 1992, there is a clock program from C.Jackson. This uses two successive

readings from the Frame Counter and takes the smaller as being the correct one. The original Spectrum Basic Manual (page 99, but don't forget that there were several editions) told one to accept two readings and to accept the larger. It turns out that both are right: it all depends on the order in which one PEEKs the bytes from the counter.

If one PEEKs the most significant Frame byte first then there is the danger that one will miss a carry, by PEEKing a Frame byte just before it is about to receive a carry, and then PEEKing the next less significant Frame byte just after it has delivered this carry and has now reset itself to zero. The time reading will then be low, so the higher of two successive readings PEEKed will be the correct one.

If one PEEKs the least significant Frame byte first then one might PEEK the least significant Frame byte just before it is about to deliver a carry, and is still at 255, and then PEEK the next Frame byte just after it has this carry. The time reading will then be high and the lower of the two readings will be the correct one.

If the carry in the Frame Counter were passed on infinitely fast, either type of error would be equally probable. So Mr Cooke-Yarborough devised a very short program to test this. "Frames" repeatedly PEEKs the Frame bytes to obtain Time, and checks for cases where a Time reading is smaller than the previous one, printing out adjacent Time readings when this happens. Here's his program.

```
80 REM FRAMES
90 LET p1=0: LET p2=0: LET p3=0
100 LET p=PEEK 23672+256*PEEK 23673+6
      5536*PEEK 23674
105 IF p1<p2 THEN LPRINT p3;" ";p2;" "
      ";p1;" ";p;" ";p1/256
110 LET p3=p2: LET p2=p1: LET p1=p
130 GOTO 100
```

PEEKing the most significant Frame byte first yielded 34 errors in 7 minutes (4.9 per minute). All errors

were low by 255.5 frames, compared with the average of the two adjacent readings (which differed by three frames, and so gave a non-integral average). So, on average, there were 5 errors a minute. A similar run where the least significant byte was PEEKed first gave 27 errors in 23.6 minutes, or 1.14 errors a minute. These were, of course, all high by 255.5 frames compared with the average for adjacent readings, which again differed by three frames.

Although one would expect occasional errors 256 times as large, due to missing or double-counting the carry into the most significant byte, these occur only once in 22 minutes, and therefore errors from them were not picked up in these tests.

So, in these tests, carries from the least significant Frame byte happen every 5.12 seconds or 11.7 times a minute, so 42% of the carries caused errors in the first place and 10% in the second.

Therefore, if the Spectrum takes a significant amount of time to propagate a carry up the frame counter, then one would expect a lower probability of error in the second case: if the PEEKs could be made to move up the frame counter at the same speed as the carry, then the errors ought to disappear!

What does all this mean in practice? Well, for a start, you don't always need to read the time twice from the Frame Counter. So, if your program's repeatedly reading the frame Counter waiting for a specific time, it's best to start PEEKing from its most significant byte to avoid possible premature action. On the other hand, if you must avoid a low time reading and can tolerate an occasional high one, then it's best to start PEEKing the Frame Counter from the least significant byte. Both cases are in the following program:-

```
90 REM REACT
100 CLS : RANDOMIZE : PRINT " MEASURE
MENT OF REACTION TIME"
```

```
110 LET t=1000*RND
120 PRINT : PRINT "Hold down ',' key
to run": PRINT "'Space' bar to St
op"
130 IF INKEY$<>"," THEN GOTO 130
140 CLS : POKE 23673,0: POKE 23672,0
150 IF INKEY$<>"," THEN CLS : GOTO 11
0
160 LET x=INT (RND*27+.5): LET y=INT
(RND*21+.5)
165 REM PRINT AT y,x; OVER 1;"XXXX"
170 IF 256*PEEK 23673+PEEK 23672<t TH
EN GOTO 150
180 PRINT AT y,x;"STOP": POKE 23673,0
: POKE 23672,0
190 IF INKEY$<> " " THEN GOTO 190
200 LET tr=(PEEK 23672+256*PEEK 23673
)/50: CLS : PRINT "Reaction Time:
";tr;" secs": GOTO 110
```

D'you ride a bike; drive a car. We all know how important reaction times are; recently, TV pointed out how elderly car drivers could become a hazard because their reaction times slow with age. As Mr Cooke-Yarborough is now in his 70's, he was concerned and therefore wrote this test program. Start it by pressing the comma key. After a random time, STOP appears on the screen. Now press the space bar and your reaction time is displayed.

The standard time used in traffic assessments is 0.6 seconds, and fortunately our friend is just inside this; his wife well inside (bully for her!). Fine, you say, but what about the delay in the actual program? Well, he's tested this, too, by inserting "." in line 190 and STOP before the GOTO in line 200. There was a delay of one frame count (.02 sec) on rather less than half the 24 runs he tried; so the program delay is less than 10 milliseconds; small enough to ignore.

As a final twist, line 165 is REMmed. I mean if you do a lot of driving like me, you realise that the reason that the STOP time being limited to 20 seconds is that a greater time becomes boring: you start to lose concentration. So let's put in some distractions. You're driving in an ill-lit town on a dark, wet night. Little lines of "XXXX" appear at random all over the screen. Then STOP

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W1302	SAM to TV/Monitor Scart Cable	£9.95
W1303	MIDI Cable Set	£6.95

E. & O.E. Prices valid, subject to availability, until 1st September 1993.

UK Postage & Packing: Add £10 for computers (sent by insured carrier). All other items add £1 per item (max £5).

Overseas customers: Please write for quote on Airmail Insured Delivery Service.

Write your order clearly on a reasonable sized piece of paper, state your name; address and phone number. Cheques, Postal Orders, Euro-cheques should be made payable to West Coast Computers. We will try to dispatch your orders as quickly as we can - however please allow 28 days to be on the safe side.

There are other item not listed above (including a Video Digitiser and a dedicated SAM Modem) which will be available in the next few months - watch out for our next advert.

appears among the Castlemaines. What does this do to your reaction time? Well, what you waiting for? Get typing!

Mr Jackson of Creigiau, Cardiff, writes to tell me more on Alan Cox's "Gasket" program (Nov. 1992). For instance, p in line 4 can be allotted values of 1,2,4,8,16 or 32 - you might have to wait a while for visible action; the results are like those of a recursive program in which the depth of recursion decreases with increase of p. I expect Alan could arrange for p=64. The programs (he writes) can be slightly simplified with PLOT 128-m, 150-m at line 20; Draw 2 [this looks like x superscript, so I guess it's 2 to the power x]m-1,0 at line 30; omit "AT 0,0" at line 120 and just PAUSE 0: INPUT; at line 130.

Three days later, another letter arrived. "Another simplification of Alan Cox's "Gasket" is to omit lines 40 and 45. The program has kept me amused for hours!" Many thanks, Mr Jackson.

Funnily enough, Daniel Sheridan of Lichfield wrote about the same time, again on a PLUS D disc (short of Speccy items last month, so the troops have responded). Among the items he sent are "Gasket" which generates a Sierpinski gasket of order 128 and Gasket2 which generates one of order 64. I'd typed this in when I looked at his disc and found that the lot was code: every item. A pity, for they work rather nicely.

Anyway, I've translated "Gasket". It took a long time to type this all in - longer than I could really spare. If you send me bits of code (and they're very welcome) you must send me some sort of translation which I can put in the column if your intention is that it should be published. Perleaze!

```
10 CLEAR 29999
20 FOR a=30000 TO 30218
30 READ n: POKE a,n: NEXT a
40 RANDOMIZE USR 30000
50 DATA 195,31,118,66,8,203,58,56
60 DATA 18,62,2,162,238,2,61,203
```

```
70 DATA 66,40,4,132,103,24,25,133
80 DATA 111,24,21,62,1,162,203,39
90 DATA 170,230,2,238,2,61,133,111
100 DATA 62,2,162,238,2,61,132,103
110 DATA 203,67,40,13,229,217,193,121
120 DATA 72,71,205,229,34,33,88,39
130 DATA 217,8,80,201,71,197,205,51
140 DATA 117,193,5,194,117,117,201,6
150 DATA 2,197,61,193,5,194,129,117
160 DATA 167,202,168,117,6,2,197,60
170 DATA 193,5,194,142,117,203,63,205
180 DATA 250,117,205,116,117,205,250,
117
190 DATA 205,116,117,203,39,195,180,1
17
200 DATA 6,2,197,60,193,5,194,170
210 DATA 117,205,116,117,201,6,2,197
220 DATA 61,193,5,194,183,117,167,202
230 DATA 237,117,6,2,197,60,193,5
240 DATA 194,196,117,203,63,205,116,1
17
250 DATA 6,2,197,20,193,5,194,210
260 DATA 117,205,250,117,6,6,197,20
270 DATA 193,5,194,222,117,205,116,11
7
280 DATA 203,39,195,249,117,6,2,197
290 DATA 60,193,5,194,239,117,205,116
300 DATA 117,201,205,127,117,6,3,197
310 DATA 20,193,5,194,255,117,205,116
320 DATA 117,6,3,197,20,193,5,194
330 DATA 11,118,205,181,117,6,2,197
340 DATA 20,193,5,194,23,118,201,8
350 DATA 1,0,88,175,11,2,62,63
360 DATA 184,194,35,118,8,33,0,0
370 DATA 22,0,203,195,71,197,61,193
380 DATA 5,194,53,118,6,128,197,60
390 DATA 193,5,194,62,118,205,250,117
400 DATA 201,0
```

In recompense, Daniel mentions in his letter that he has a simple way round the problem of the numbering of the cards - you remember; it's been cropping up in several Short Spots. Variables A, K, Q and J are set to the appropriate values, and function VAL is used. For example, if the card value is in C\$ then:- LET a=14: LET k=13: LET q=12: LET j=11: LET c=VAL c\$. Many thanks, Daniel.

Roy Burford of Stourbridge writes with profuse thanks for the Printer DUMP Driver to Mr Olyott. Cheers, Roy, glad it was of use to someone.

Let's end with SAM, shall we. Ewen and Penny Wilby of Dewsbury, West

Yorkshire, sent me a SAMdisc, along with a very addictive card puzzle. No; I can't solve it; I'm thick, and I'm never going to get "Short Spot" together if I play with it any longer. But it was very nice of you to send it along. I've not passed it to my younger son yet, for fear he will complete the whole shebang in about three minutes.... The Evans also mention that they have sent me some useless, but pretty programs that use GET and PUT along with a short maths routine using SIN and COS. The whole thing forms a suite, although it all looks as though it's in bits. The first thing you do is type in the program "Alienbrain". Then RUN the program and see the result build. To use the others, merely merge the next file into "Alienbrain" and RUN. Some of the routines like "triloop" follow a set path all the time, while others, like "snake", seem to follow a completely random path. "I don't know whether you or any of FORMAT's other readers have ever seen EQUINOX's CHAOS program," writes Ewen, "Where a double pendulum was shown to have a set path at slow speed, then seemed to have a random path when swung faster: well, this program seems to follow that theory quite well."

Anyway, here they all are...I rather like the green balls...(thought that would tantalize you...).

ALIENBRAIN

```

10 REM COPYRIGHT
20 REM Ewen A Wilby. (c)1992.
30 REM
50 MODE 4: PALETTE : CLS # : LIST F
     ORMAT 2
60 FOR x=1 TO 15: READ a: PALETTE x
     ,a: NEXT x
70 DATA 4,8,64,7,66,15,74,112,71,12
     0,79,119,124,127,127
80 LET r=9: LET x=127: LET y=87
90 FOR i=1 TO 14
100 PEN i: CIRCLE x,y,r: FILL PEN i,
     x,y
110 LET r=r-.5: LET x=x+.5: LET y=y+.
     5
120 NEXT i
130 GRAB a$,116,98,22,22
140 CLS

```

```

150 PEN 15: CIRCLE 127,87,9
160 FILL PEN 15,127,87
170 GRAB b$,116,98,22,22
180 CLS
185 LET t=0
186 REM MAIN LOOP
190 DO
195 LET t=t+0.1
200 LET x=113*(1+SIN t): LET y=86*(1
     +COS t* COS (1.05*t))
210 PUT x,y,a$,b$
216 IF x=256 THEN LET x=0
220 ON ERROR GOTO 190
240 LOOP

```

Now try the following variations:-

BUTTERFLY

```

200 LET x=113*(1+SIN t* SIN (1.05*t)
     ): LET y=86*(1+COS t)

```

SNAKE

TAPEWORM

```

200 LET x=113*(1+COS t* SIN (1.075*t
     )): LET y=86*(1+SIN t* COS (1.12
     5*t))

```

```

200 LET x=113*(1+COS t* SIN (.075*t)
     ): LET y=86*(1+SIN t* COS (.125*
     t))

```

EARTHWORM

```

200 LET x=113*(1+SIN t* SIN (1.075*t
     )): LET y=86*(1+SIN t* COS (1.12
     5*t))

```

Our grateful thanks to the Wilbys, I'll give you a few more variations next month if there is space for them.

And that's all for now, folks. My thanks to all who have sent - please keep it up; send the stuff in on disc, with an accompanying printout and description, and take particular care if it's a piece of code! Makes my life so much easier. Please send it to John Wase, Green Leys Cottage, Bishampton, Pershore, Worcs WR10 2LX, and I'll try to put an interesting column together for you.

I Look forward to next month. See you!

USING PRINTER CONTROL CODES

By:- John Redfern.

When you first get a printer and start working your way through the manual it all seems fairly straightforward as you make your way through the various chapters on setting up, testing, connecting to your computer then doing that first test run and finding that you've got a) nothing at all; b) everything printed on the same line; c) just a load of rubbish; or d) a mixture of all or some of these. When you finally get all this sorted out and manage to get it printing out your letters from your Word-processor and you have read a bit more of your printer manual you come to that section headed (for Epson Printers) USING THE ESC/P COMMANDS, which on closer inspection seems to be another language!

Now lots of people call these 'ESCAPE' Codes but what ESC/P really stands for is Epson Standard Code for Printers (so I suppose ESCAPE is easier to say) and what these codes really do is to give you total control over the output of your printer. A typical entry in the manual may look something like this:-

ESC W

[Turn double width printing on/off]

ASCII	ESC	W	n
Decimal	27	87	n
Hex	1B	57	n
Keyboard	Ctrl [W	Ctrl A or @

where 'n' can be either 1 or 0 to turn Double Width printing on or off, in which case the above codes would translate into either of the following lines to turn Double Width ON using ASCII Codes.

```
LPRINT CHR$ 27;CHR$ 87;CHR$ 1;  
LPRINT CHR$ 27;"W";CHR$ 1;
```

Or replace the CHR\$ 1 with CHR\$ 0 to

turn the effect OFF.

To turn Double Width ON/OFF using actual characters the lines would be as follows:-

```
LPRINT CHR$ 27;CHR$ 87;CHR$ 49;  
LPRINT CHR$27;"W1";
```

We use CHR\$49 because that is the code for '1' in the ASCII set. CHR\$ 48 could be used instead of CHR\$ 0 to turn the effect off.

You will notice in the above examples that the usual forms that we use are the Decimal or ASCII. The HEX form of the ESC Codes are not normally used from BASIC and the KEYBOARD forms cannot be used on the SPECTRUM or SAM.

You will also notice that all the different ways of entering the Codes begin with CHR\$ 27. This is the signal to the printer that what follows is a Code and not text, and with only a few exceptions all printer codes begin in this way. Two notable exceptions are CHR\$ 10 (Line Feed) and CHR\$ 13 (Carriage Return) which are sent without the preceding CHR\$ 27.

The above examples show how to translate the Manual tables into BASIC lines which you can use in your programs to set your printer to do many and varied things. It is beyond the scope of this article to even try to explain all the possible combinations of codes possible to give all sorts of print styles and graphics available on most printers. On my own printer for example there are five different Character sets held in ROM. These are Italic - International - Graphic - IBM Graphic and Special Graphic. These combined with the print styles available, Draft and NLQ in Roman and Sans Serif and all the

different styles available with the use of the ESC Codes as outlined above give an almost infinite number of different effects which can be obtained from the printer.

When you have been experimenting with these codes you may find that you cannot get rid of them from your printer. The surest way is that old standby of the Spectrum - Turn it off! When you switch it back on it will be in its default state. The other way is to send an ESC code. On Epson printers this is ESC @ or CHR\$ 27;CHR\$ 64; this is the Initialize Printer command and will clear the printer and reset it to its default state. It's a good idea to send this command before sending a set of commands to set up a new type style.

Before sending anything to the printer you must set the printer interface into the right mode so that the correct signals are sent. On the SAM this means opening a Binary or 'b' channel to send the codes, and a Print or 'p' channel for the Text. Stream #3 defaults to the 'p' channel on power up but to avoid the 'Stream open' error message it is wise to close it and then open it again each time, and to save constantly changing over why not open two channels:-

```
CLOSE #3: CLOSE #4
OPEN #3;"p"
OPEN #4;"b"
```

Then you can do PRINT #4;CHR\$ 27; etc. to set up the printer and PRINT #3;"FORMAT IS BEST" for your text.

On the Spectrum with PLUS D or DISCIPLE the format is slightly different. You don't OPEN and CLOSE streams as on the SAM, instead you do POKE @6,1 to allow the ESC codes to get through to the printer, then do a POKE @6,0 before you send your text.

```
POKE @6,1: PRINT #3;CHR$ 27; etc. to
set up the printer
POKE @6,0: PRINT #3;"FORMAT IS BEST"
for your text.
```

(You can of course use LPRINT in place

of the PRINT #3 because both do exactly the same job).

If you want to put the control codes into a variable to save some typing, the format is slightly different, instead of typing:-

```
PRINT #3;CHR$ 27;CHR$ 87;CHR$ 1;
you type instead
LET A$=CHR$ 27+CHR$ 87+CHR$ 1
then you can
PRINT #3;A$; to send the Codes to
the printer
```

So far we have only concerned ourselves with sending a single ESC code to the printer. If you wish to combine two or more codes to produce a different effect it is simply a matter of sending them one after another until the required style is achieved.

```
PRINT #3;CHR$ 27;CHR$ 77;CHR$ 27;CHR$ 69;
```

Will select both ELITE (27,77) and EMPHASIZED (27,69) modes, similarly with most other codes. There are a few combinations which are not allowed but these are usually mentioned in the printer manual.

The ESC codes used in this article are for the Epson LX800 but the codes for other printers will be similar if not the same. The principles involved are the same for all printers however, and it's just a matter of checking your manual (by the way, all the experts agree - no printer is worth buying without its manual) for the correct codes to do the job you want.



'What on earth do we give a man who has everything?'

MACHINE CODE

WITHOUT THE TEARS

Part 17.

By:- Carol Brooksbank.



CALCULATIONS

We have seen how some very simple arithmetic may be handled in machine code: INC and DEC will add or subtract 1; ADD, ADC and SBC are accurate if none of the numbers involved, nor the answer, exceed 255 (single registers) or 65535 (register pairs); SUB can only do subtraction on single registers; RL and RR double or halve the contents of a single register, provided the answer does not go above 255 or below 1. But how do we handle bigger numbers, multiplication and division by numbers other than 2,4,8 etc., and decimal values?

Sam and the Spectrum both have a second processor, called the Floating Point Calculator (FPC for short). The FPC's name doesn't do it justice, because it can handle much more than calculations. It can be used to manipulate strings and to access numerous BASIC operations, but as this is a beginners' course we shall concentrate on its use for arithmetic, with a brief look at how it stores string parameters. It has its own stack, which works like the Z80's stack - a new number pushed onto the stack covers up the ones below which cannot be reached until the top one

has been taken off. It has its own set of opcodes, called literals.

Numbers are put onto the FPC stack in 5-byte form. Whole numbers between -65535 and 65535 can be stored in what is called small integer form, and the 5 bytes are then;

1	2	3	4	5
0	0-positive number	LSB of 255=negative number	MSB of number	0

So, for the number 1000, whose MSB is 3 and LSB is 232, the five bytes would be:-

0	0	232	3	0

With negative numbers, you add 65536 to the number and put 255 in byte 2, so -1000 would use the bytes for 64536:-

0	255	24	252	0

All other numbers, larger, smaller or non-integer are handled in what is called floating point form, and small integers can also be handled in this form. There are still five bytes, but the bits are manipulated to hold all the information necessary - where the decimal point comes, what all the digits are, and whether the number is positive or negative. (Only one bit is used to show +/-, not a whole byte as in small integer form.) The business of converting a number to its floating point form is rather complicated, but fortunately we don't need to bother with the details as the computer will do the work for us. I shall be giving a book list later for those who want to study how floating point conversion is done, or to know how to use the FPC for more advanced operations.

SPECTRUM/SAM FLOATING POINT CALCULATOR COMMANDS
STACKING AND UNSTACKING NUMBERS

To stack an integer below 256
Spectrum Load the number into the A register, CALL 11560
Sam Load the number into the B register, Use RST 40 and the literal 35
To stack an integer between 0 and 65535
Spectrum Load the number into BC, CALL 11563
Sam Load the number into HL XOR A LD E,A LD B,A LD D,L LD C,H CALL 295
To stack a number in 5-byte form, held in AEDCB registers
Spectrum CALL 10934
Sam CALL 295
To fetch an integer below 256 from top of FPC stack
Spectrum CALL 11733 (returns number in A register)
Sam CALL 289 (returns number in L, C and A registers)
To fetch an integer between 0 and 65535 from top of FPC stack
Spectrum CALL 11685 (returns number in BC register)
Sam CALL 289 (returns number in HL and BC registers)
To fetch a number in 5-byte form into AEDCB registers
Spectrum CALL 11249
Sam CALL 292

Fig.1

We enter the FPC by using the instruction RST 40. All the bytes which follow that will be interpreted as FPC literals until the byte 56 (Spectrum) or 51 (Sam) is met. That byte means exit the FPC and treat the next byte as a normal Z80 machine code instruction. (Unfortunately the Spectrum and Sam literals are different - but more of that in a minute).

But usually, before we call the FPC, we need to put some numbers on its stack that we can work with. Fig. 1 shows how we stack positive integers below 65535, and how we retrieve the top number from the FPC stack on both machines. (We will look at large and decimal numbers next month.) Retrieving the top number is done by fixed ROM routines in both machines,

fetching the number in A (0-255), or BC (0-65535). Sam, in fact, always retrieves a number in both HL and BC, with A holding a copy of L. On the Spectrum you must decide whether you want the number in A or BC, and use the appropriate routine. On both machines if you want the number in 5-byte form, you can retrieve the bytes in the registers AEDCB (byte 1 in A, 5 in B).

Stacking numbers on the Spectrum is also done by using fixed ROM routines. On Sam things are a little different. You can put a number below 256 in the B register. When you enter the FPC, it copies the contents of the Z80 B register to the FPC's own B register, (which we call BREG to avoid confusion) and literal 35 means "Stack the number in BREG". Numbers between

SPECTRUM/SAM FLOATING POINT CALCULATOR COMMANDS
THE MORE COMMONLY USED LITERALS

SPECTRUM	FUNCTION	SAM
15	ADD - discard top two numbers and stack their sum	1
8	AND - discard top two numbers and stack result of N1 AND N2	12
2	DELETE - discard top number	7
5	DIVIDE - discard top two numbers and stack result of N1/N2	5
49	DUPLICATE - stack another copy of top number so N1 and N2 are the same	37
1	EXCHANGE - swap top two numbers on the stack	6
56	END CALCULATIONS - exit FPC and perform next instruction	51
4	MULTIPLY - discard top two numbers and stack result of N1*N2	0
27	NEGATE - replace top number by same number but with + or - reversed	93
7	OR - discard top two numbers and stack result of N1 OR N2	10
6	POWER - discard top two numbers and stack result of N1^N2	4
61	RESTACK - transform top number to full floating point form (if not in that form already) and re-stack it in that form	49
40	SQR - discard top number and replace it with its square root	67
160	STKZERO - stack the number 0	225
162	STKHALF - stack the number 0.5	224
161	STKONE - stack integer form of 1	233
164	STKTEN - stack the number 10	236
163	STKHALFPI - stack $\pi/2$	240
3	SUBTRACT - discard top two numbers and stack result of N1-N2	3
58	TRUNCATE - remove all digits after the decimal point in top number	48

LITERALS ONLY AVAILABLE ON SAM

EXCHANGE13 - swap top and third numbers on stack	28
EXCHANGE23 - swap second and third numbers on stack	29
EXIT AND RET - exit FPC and perform RET	52
LOADB - put next byte in BREG	33
STK1BYT - stack the next byte as a number (0-255)	38
STK5BYT - stack next 5 bytes as any number	39
STKSOME - use next byte as counter and stack that number of the following bytes	40
STKFONE - stack floating point form of 1	230
STKB - stack contents of BREG	35
STK16K - stack 16384	226

Fig. 2

256 and 65535 must be already in small integer form before we can stack them, so we have to put the 5 bytes into AEDCB and use the routine for stacking a 5-byte number.

Fig. 2 is a list of the literals you are most likely to be using, with the code number you need to put in your listing. Only a couple are the same on both machines. Quite a lot of them do calculations involving the top two numbers on the stack, discarding both of them and leaving the answer on top of the stack. In these cases, N1 is the number you put on first, and N2, the one you put on next, so N2 is the top number and N1 is the one below it.

The easiest way to see how all this works is to write the listing for a sum and try it out. The sum we will do is:-

$$(1860+27) / ((350*2) - 71)$$

or

$$\frac{1860 + 27}{(350 \times 2) - 71}$$

The listing is for the Spectrum, with the changes needed for Sam in brackets on the relevant line. Where there are no values or opcodes in brackets, the instructions are the same for both machines.

```

ORG ???? (choose your own
address)
ADD EQU 15 ;(SAM users 1)
DIVID EQU 5
ENDCAL EQU 56 ;(SAM users 51)
MULTIP EQU 4 ;(SAM users 0)
SUBTR EQU 3
STKWRD EQU 11563;(SAM users omit)
STKBYT EQU 11560;(SAM users omit)
UNSTWRD EQU 11685;(SAM users 289)

```

We set up the literals and ROM routine addresses we shall be using as variables, so that the operation of the listing will be clearer. Sam users omit two of the variables, because we have no ROM subroutines to use and shall have to write our own.

The diagrams within the listing show the positions of numbers on the FPC stack after each operation. The shaded area marks the bottom of the stack.

```

START LD BC,1860 ;SAM users LD HL
CALL STKWRD

```

We stack the number



```

LD A,27 ;SAM users LD B
CALL STKBYT

```

Stack the number 27



```

RST 40
DEFB ADD
DEFB ENDCAL

```

Enter FPC, add the numbers
and exit FPC



```

LD BC,350 ;SAM users LD HL
CALL STKWRD

```

Stack 350

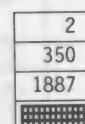


```

LD A,2 ;SAM users LD B
CALL STKBYT

```

Stack 2



```

RST 40
DEFB MULTIP
DEFB ENDCAL

```

Use FPC to multiply
top two numbers

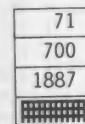


```

LD A,71 ;SAM users LD B
CALL STKBYT

```

Stack 71



```

RST 40
DEFB SUBTR

```

Subtract the top number
from the second one down



```
DEFB DIVID 3
DEFB ENDCAL
```

Divide the top number into the second one down, which leaves the final answer as the only number on the FPC stack.



```
CALL UNSTWRD
RET
```

The answer is fetched in BC, so that PRINT USR ???? (your ORG address) will print the answer to the sum on screen.

```
END EQU $
LENGTH EQU END-START
```

SAM users will need to insert the following subroutines between the final RET and END

```
STKWRD XOR A
LD E,A
LD B,A
LD D,L
LD C,H
CALL 295
RET
```

The subroutine is called with HL holding the number to be stacked. Registers A,E and B are loaded with 0, the number LSB is copied to D and the MSB to C, so that the registers AEDCB hold the 5 bytes of the number's small integer form. The ROM fixed routine at 295 stacks a number already in 5-byte form and held in those registers.

```
STKBYT RST 40
DEFB 35
DEFB 52
```

The subroutine is called with the number to be stacked held in B. The FPC is entered, which causes the number in Z80 B register to be copied to FBC BREG. Literal 35 is the opcode for STACK BREG. Literal 52 is EXIT FPC and perform a RET. (There is no Spectrum equivalent to Sam literal 52).

Sam users may wish to save these two subroutines as library routines.

Your object code should be loaded to your ORG address, and PRINT USR that address will put the number 3 on screen if you have entered everything correctly.

It is only fair to Sam users to explain that I have written STKBYT so that the main listing is the same for Sam and Spectrum. Sam has another literal, 38, which means STACK THE NEXT BYTE. That means there is no need to leave the FPC to stack numbers, and the listing can be much more efficient. So for Sam only, here is the alternative listing. Set up an extra variable in the list at the start:-

```
STK1BYT EQU 38
```

The main body of the listing, between START and the RET, would be:-

```
START LD HL,1860
CALL STKWRD
RST 40
DEFB STK1BYT
DEFB 27
DEFB ADD
DEFB ENDCAL
LD HL,350
CALL STKWRD
RST 40
DEFB STK1BYT
DEFB 2
DEFB MULTIP
DEFB STK1BYT
DEFB 71
DEFB SUBTR
DEFB DIVID
DEFB ENDCAL
CALL UNSTWRD
RET
```

You need to retain the subroutine STKWRD, but no longer need STKBYT.

I shall continue to write routines to suit both machines as far as possible, but Sam users can always change any instructions involving STKBYT to use the form in this alternative listing.

Next month we will look at the way decimals and big numbers are used and retrieved. See you then.

SOFTWARE FOR THE SAM COUPE

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The HELP PAGE

Edited By:- Kevin Gould.

It seems only like yesterday that I sent the help page disc to Bob and here we are again. The postlady really loves me, she comes with a sack full of mail, a thud on the mat and she leaves with a wide smile.

Project printer and Project VDU. The latter is being run by Ray who would like those using VDUs or have converted TVs to work without the TV modulator to write with make, computer, connections, problems, modifications etc. My project is based on the number of letters I have received on printer problems. My intention is to build a library of make & model, computer(s), control codes, interfaces, DIP switch settings and problems and how these have been overcome. Especially when changing from Spectrum (in any guise) to SAM. Please include RS232 applications.

Explanation time:- In Febs issue I wrote a section 'Writing to the Help Page', what I did not say, which is my fault, was that both Ray and I will naturally continue to accept the written (printed) word. Several members wrote saying what happens if their problem is disc based, sending a disc is no use, I quite agree, paper is always acceptable. But if your question is long then a text file helps as it saves us a lot of typing.

A further question raised was very good, how can sending a disc with a non-Tasword file help (i.e. BASIC in program form). Well sometime ago FORMAT published an excellent program which converts a BASIC program to a Tasword 2 file - again saving typing.

I have received a couple of letters from readers wishing to expand the BASIC part of Tasword 2. This has been covered several times in FORMAT and I suggest buying back issues.

Now, I am calling on all members (in particular +3 owners) for help. In the February edition, Mr Burrows had a problem with 'The Last Word' on his +3. He has since written (thanks) to say that our suggestion for incorporating the POKEs into the program does not work. Once the POKEs are in, the program stops even though the last line of the new DISK is an instruction to LOAD the renamed original DISK file. He has two +3 and the result is the same on both.

I am sorry, I do not know the answer as I have never used a +3 or 'The Last Word'. I would normally suggest sending me a disc but on this occasion it would be no use. So come on readers, write, this man needs help.

Now to Eric Olyott. Thanks for both your discs. You should have received your disc by now. Regarding your question, Yes, you can have hidden files (by this I presume you mean that the filename does not appear on the directory) on the PLUS D, but not with G+DOS 2a. I have this feeling that some clever member(s) will say YES, if so, please write and say how. Uni-DOS from S.D. Software has this feature amongst its many advances. Thanks for the second disc and excellent contribution to Project Printer.

Next two letters from Doug Casterton of Hucknall, Notts. I received the second one after typing the answer to the first (Thank you to the person who invented word processors.) Letter 1: The end result regarded verifying. As far as I know you cannot VERIFY directly the contents of RAMDISC with the contents of a microdrive file, verification can only be done between microdrive and main memory or ramdisc and main memory. Letter 2: How is a file held on microdrive cartridge and what has happened when it fails with

an "End of file" report.

First, I don't know how a particular file is held, there are so many different ways. Second.. You are simply reading beyond the length of the file for some reason. I suggest you incorporate some type of end of file marker which when INPUTing, your file you can check for and, upon reading this, take the appropriate action as the end of file is reached. I am not sure but hope to have answered your questions.

Next an apology. I have got the question but in an attempt to tidy up I have lost your name. Sorry, here's the question of which I am hoping someone is going to provide the answer for you and many in one go. He is a +2a owner with PLUS D and 3.5" drive. Problem Ramdisc. He enters +3 BASIC, types in SPECTRUM, LOADS G+DOS 2a. Types in RANDOMIZE USR 23354 which returns him to 128k +3 BASIC. This should give him access to the disc and RAMDISC, it doesn't. As I know from mine, access to disc is O.K if the command is in a line i.e

10 LOAD d1;"filename".

Problem, SAVE to ramdisc in Basic i.e.

20 SAVE "m:"
30 SAVE "filename"

or

20 SAVE "m:filename"

should SAVE filename to ramdisc, no chance if you have used the disc before. The screen displays the tape saving message. I am sorry, I have tried many ways to overcome the problem and can't find one. Does anyone know how?

I have had a few letters on the following - February Short Spot page 9 and the fantastic utility to print all the variable names in a program. The results seem to vary slightly so I tried it on both my +2a in 48k mode and a 48k Spectrum with the same results as most of you, screens of \$ the differing results being what your BASIC program was. I wrote a BASIC

database between lines 140 and 9700 and 9715 and 9999. These fit nicely into the utility program.. result.. two variables, two loops printed as FOR and screens of a single column of \$. Unfortunately, two of the variables did not exist. I also cannot see any reason (unless I am being thick which is quite possible) for the two arrays and w\$ (lines 100,110,120). Answer: I have not got one. If your's works, please tell.

M.O'Connell has a printing problem. He has recently bought a Star LC100 colour printer and would like further information on printing graphics and screen pictures (dumps).

You are quite right, MGT did produce software for this purpose. Colour dumping was covered by Villy Feltman back in November 89, when he re-wrote the BASIC part. The subject as far as I can see has not been covered since. Your 48k and PLUS D is running UNI-DOS I can't say whether that would have any effect on the MGT software. I am again calling on readers to help, have you any commercial or self written software that will solve his/her problem. You will also be contributing to Project Printer.

Now, to SAM. Evelyn Jerrard asks where are the block graphics on SAM? The standard block graphics are in place from start up and reside just above the character set, starting at address 21648. You say that you were only able to find four of them so I suspect that you were trying to enter them into the edit area without enclosing them in quotation marks, this results in mainly command words or question marks being displayed, and only four block graphics appearing when the appropriate keys are pressed.

Like so many other things, the User's Guide fails to mention this, seeming to assume you have previously used a Spectrum. You should also note that the keys defined for the blocks on page 89 of the manual are out of order, but those on page 178 are correct.

With reference to your second question concerning clip art, can you let me know which program you are using?

Tony Jeenes of Malvern writes that he has just completed a Morse receive program which decodes and prints (with the sound chip activated) for speeds up to approximately 70 w.p.m., with a rough calculation of the speed as appropriate. He included a machine code routine for sampling Bit 6 of Port 254 which counted the leading edge rate of sound samples at different frequencies. The results he obtained were extremely variable as shown in the table below:-

Freq (Hz). 392 622 830 988 1108 1318
Rate range. 1-4 2-6 3-8 3-9 3-10 4-11

Well Tony, there is nothing wrong with the way that you are using Port 254, the main problem is that any simple routine can only be accurate over a limited frequency range. The sampling routine has a time constant of it's own and, to put it in simple terms, outside of that range it will occasionally miss the leading edge of a pulse whilst it goes round the loop. At first I thought the problem might have been exacerbated by the delay you were using between samples, but playing around with this made very little overall difference. I then modified the routine to make several passes - averaging the results. But although this was slightly better, it only improved the selectivity on four of the frequencies.

As you are running this on SAM, I then looked at the SAM ROM to see what the Tape reading routines do, and this provided the answer. The code below makes use of the EDGE2 routine in SAM (so saving you writing a lot of code), and takes 50 samples of the time between successive leading edges, retaining the highest value found. As it is measuring time and not number of pulses, the output is inversely proportional to the frequency, and with no signal the output is zero. The output is held in the BC register as, for test purposes, I was using the

PRINT USR Address call.

```
DI
LD A,0
LD (STORE),A ;Zero output store
LD C,0 ;Zero edge value.
LD A,50 ;Set loop counter.
LOOP: PUSH AF
CALL 8261 ;ROM EDGE2 routine.
CALL 8261 ;Call again. Value is
in C reg.
LD A,(STORE) ;Fetch last value.
CP C ;Compare with last value.
JR NC,SKIP ;Jump if new value
is not larger.
LD A,C
LD (STORE),A ;Store new value.
SKIP: POP AF ;Fetch loop counter.
DEC A
JR NZ,LOOP ;Continue if not
zero.
LD B,0
LD A,(STORE) ;Fetch final value
LD C,A ;Place in C reg.
EI
RET
```

The results I obtained with this routine, which is certainly very selective over the frequency range you mention, is shown below:-

Freq (Hz).	Time Range.
392	233-236
622	193-195
830	141-143
988	117-119
1108	103-105
1318	85-86

Eric Day of Porthcawl sent me a disc on which he had used a recently purchased disc back-up program. After running the program he found that, although both discs now held identical directories, neither the master disc or the copy would load the programs listed, all giving the End of File error message. On carrying out a sector analysis on the master disc, I found that the sectors allocated to the files were all blank. In the latest jargon this is truly the nightmare scenario! Eric must have mixed up the discs after the Directory had been transferred and inadvertently copied all the blank sectors from the newly formatted disc to the master

disc. This is a particular danger if you have only one drive, when the discs have to be swapped at intervals during the back-up.

Malcolm Jones of Ladybarn has three questions. He wonders if there is some way of preventing the screen from displaying an amended listing every time a change or new entry is made to the program. Secondly, he was unable to enter two of the lines to Bob's Golf program (Vol 6/4), namely lines 1000 and 9530. And finally, why does he get an Out of Memory message when he tries to FORMAT more than one RAM Disc with the 1Mb extension fitted?

There is one way of preventing the screen from displaying changes if you use the MasterBASIC's split-mode display facility. However it does mean that you are typing blind, which is not much use practically, and the part of the screen you cannot see is updated anyway so it doesn't save any time, which seemed to be your main concern. In reply to your second question unfortunately there was a typing error in Bob's program and in both lines USR "A" should have read UDG "A". As for your question about the RAM disc; at present I do not have an explanation for being unable to open a second RAM disc, other than the obvious one that the size of the second disc being FORMATTED is too large for the remaining memory. However, I will make further enquiries to see if there is another cause.

Thats all this month.

Addresses:- Answering a question (or providing info for Project Printer) on anything not SAM To:-

Kevin Gould, Format Help Page,
2, Barleyfield Close, Heighington,
Lincolnshire, LN4 1TX.

Anything SAM related (or info on VDUs) to:-

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ETRACKER

Reviewed By:- Carol Brooksbank.

ETRACKER is a new program for music writing on Sam. It takes over where THE SOUND MACHINE leaves off, allowing the composer to produce complex music, with a wide variety of instrument sounds, in full stereo. It is possible to produce stereo sound effects too, but the program is first and foremost a music program.

The program comes on two discs, the master disc containing the program itself and the compiler, and a program disc with sample music, pre-programmed instruments and so on. The one thing I really dislike about the program is that the master disc cannot be copied, and there is no provision for making a working or backup disc. You have to use the disc which comes in the package, and if it should ever become corrupted, send it back to the publishers for replacement. This may be acceptable copyright protection for a game. It is not good enough for a serious program. People doing serious work with their computer are often up against deadlines and cannot afford to have their work held up for a week because an important development program has to be returned to its publishers.

It is time Sam software writers took a look at some of the protection methods used in the PC world. An uncopiable master disc can be capable of producing one - and only one - uncopiable working copy of the program on another disc. (If you want it to be capable of producing more than one, you pay a hefty licensing fee to the publisher for each additional copy). If your working disc becomes damaged, you can de-install it - wipe it under the control of the master disc - after which the master will produce a new working copy.

That sort of arrangement protects

the rights of both publisher and legitimate purchaser. Too many serious Sam programs - like ETRACKER - protect the rights of the publishers at the expense of the people from whom they take money. The practice is encouraging a burgeoning trade in disc cloning programs, and so in the end is self-defeating.

The manual I received is a temporary one, put together quickly in order to get the program to the market place, and it will be replaced with the full manual shortly. Even so, it contains all you need to know to use the program, though it presupposes that you already know something about writing music for Sam. The publishers see ETRACKER as a natural follow-up to THE SOUND MACHINE published by Revelation Software, and it certainly helps if you already know some of the things you would have learned from that program, such as placing adjoining notes of the same pitch on different channels if you want them to sound as two short notes rather than one long one.

The method of entering notes is very simple. The six available channels are displayed on screen - three being allocated to left stereo and three to right. You can please yourself whether you enter all the notes on one channel and then go on to another, or whether you prefer to complete one chord at a time. As you move the cursor up or down, all six channel displays scroll simultaneously. Part of the Sam keyboard is designated as the keys for one octave - laid out like piano keys - and you simply select the octave and press the appropriate key to enter a note.

Music is written in "patterns" of up to 64 notes - how many notes you allocate to, say, a crotchet, will

depend on the shortest note you need to use. The music speed can be varied by specifying the number of frames delay between each note. If you use a continuous instrument sound that will simply change the tempo, but with an instrument which dies away completely after each note, slowing the music down through the frames delay will also make it more staccato.

Patterns are linked together to form a "song" of up to 255 pattern positions, in which up to 32 different patterns can be repeated in any order. The music can be made to loop back to any position at the end. A pattern may be transposed at a position by a given number of semitones if you wish, when all the notes in all the channels in the pattern will play at the new pitch at that position.

There is a very useful copy facility which allows you to copy any number of notes from one place to another - from one pattern to another, one channel to another, or even to another place in the same pattern. A transpose mode lets you transpose a selection of notes from a channel to another pitch. Notes may be allocated to different instruments, and any instrument may be modified by user-definable "ornaments", which allow you to produce an infinite number of different instrument sounds. Built in envelope shapes, and/or instrument inversion can also be turned on or off at any point.

You can test your music by hearing just the current pattern or the whole song, and you can turn on and off any combination of channels. As the music is playing, the channels display scrolls, so if you hear something wrong and stop the music, you are at the point where you need to edit - a great time-saver.

The instrument editor lets you define the sound of up to 31 different instruments for your music. You can set tone/noise, the volume through the left and right stereo fields, the frequency deviation, and the noise pitch if noise is operating, at up to

256 different points in each instrument. If you want a continuous sound, you can define two points between which the sound is to loop. You can imagine what a wide variety of sounds this enables the composer to produce, and how fully it lets you exploit stereo.

A similar ornament editor allows you to produce up to 31 different ornaments - patterns of pitch increase or decrease - which may be used to modify any instrument. An ornament may have any number up to 256 stages, and may also loop back if you want a continuous effect.

Both instrument and ornament editors will let you hear the sound you are creating. I would have liked to be able to hear the effect from within the editors at varying octaves, because it was a little difficult to judge a drum sound at the middle range single note at which the editors test. You have to enter the instrument into a pattern and test it out there if you want to try it played at a very low or very high pitch.

Your final music, consisting of your song and all the instruments and ornaments you are using, can be saved to disc as a module and then compiled so that you have stand-alone interrupt driven music which can be played via a short program on the program disc. This program can be adapted for use in your own programs. It is also possible to save individual instruments and ornaments to disc so that you can build up a library of sounds which can be loaded into any module.

This is a very impressive and professional program. The sample modules on the program disc show just what advanced music it is capable of. And you can, of course, inspect their patterns, instruments and ornaments to see just how they were created, which is a great help to us lesser musical mortals.

The manual does not really do the

Turn to page 31.

PROBLEM SOLVING WITH YOUR COMPUTER

By:- Don Thomasson.

This month we show how to reduce a problem to its solution by reducing it, and set another poser for puzzled programmers.

Solving last month's problem depends to some extent on specialized knowledge (or sudden inspiration) but you were given a useful hint. The equation to be solved was:-

$$1386*A+1092*B+1001*C+1716*D = 39742$$

Factorising the constants on the left of the equation, with the aid of the program last month, gives:-

$$\begin{aligned}1386 &= 3 * 6 * 7 * 11 \\1092 &= 2 * 6 * 7 * 13 \\1001 &= 7 * 11 * 13 \\1716 &= 2 * 6 * 11 * 13\end{aligned}$$

All the constants but one are divisible by 13, so to find A we compute the equation modulo 13. To do this, the equation is re-written using the following steps:-

$$(1378 + 8) * A + 1092 * B + 1001 * C + 1716 * D = 39742$$

$$8 * A + 1378 * A + 1092 * B + 1001 * C + 1716 * D = 39741 + 1$$

$$8 * A + 13 * (106 * A + 84 * B + 77 * C + 132 * D) = (13 * 3057) + 1$$

Each side of the equation has a term divisible by 13, and a remainder. Equating the remainders gives:-

$$8 * A = 1 \text{ MOD } 13$$

or:

$$8 * A = 1 + 13 * N$$

The reduced equation tells us that $A = (13 * N + 1) / 8$, and a little arithmetic shows that the only possible value for A (within the stated 10p limit) is 5, obtained with N=3.

Similar calculations in modulo 11, 7 and 6 will separate the other terms.

The program in Listing 1 will work all this out automatically, though it will not quite provide the complete solution. If you are using a SAM, which has a MOD function, you will not need the function defined in line 3010. All you need is X MOD E, which gives the remainder for an integer division of X by E. Otherwise, the routine should present no special problems.

Listing 1.

```
3000 CLS
3010 DEF FN K(A,E)=A-E*(INT (A/E))
3020 INPUT "A?";A
3030 INPUT "B?";B
3040 INPUT "C?";C
3050 INPUT "D?";D
3060 INPUT "Total?";T
3070 FOR E=1 TO 25
3080 LET F=FN K(A,E)
3090 IF F<>0 THEN LET A$="A"
3100 LET G=FN K(B,E)
3110 IF G<>0 THEN LET A$="B"
3120 LET H=FN K(C,E)
3130 IF H<>0 THEN LET A$="C"
3140 LET J=FN K(D,E)
3150 IF J<>0 THEN LET A$="D"
3160 IF (F<>0)+(G<>0)+(H<>0)+(J<>0)<>1
    THEN GOTO 3250
3170 LET L=FN K(T,E)
3180 LET R=0
3190 LET Q=(L+R*E)/(F+G+H+J)
3200 LET R=R+1
3210 IF Q>12 THEN GO TO 3250
3220 IF Q=0 OR Q<>INT Q THEN GOTO 3190
3230 PRINT A$;" = ";Q
3240 GOTO 3190
3250 NEXT E
```

The five constants having been entered, a FOR loop tries all modulo values between 2 and 25, saving the need to factorise the constants and discover the key values. If more than

one of the factors remains non-zero for a given modulus, the remainder of the calculation is skipped. If only one factor is non-zero, the name of the associated variable will be set in A\$.

Line 3190 calculates the possible values for the variable, and these are checked for validity by lines 3210 and 3220. If the value is too high, the next modulus is tried, but if the value is non-integral line 3190 is repeated with R incremented.

There may be more than one value for a particular variable. In modulo 2, C*1=0, or C=2*N, which gives 2, 4, 6, 8 and 10 as possible. However, only single values are given for A and B, and one of the two values given for D can soon be ruled out, because it gives no acceptable value for C. The program could have been extended to make this final calculation but it would have been necessary to store all the results in arrays and try all combinations of them, which would have been a complicated procedure. One of the lessons to be learned is when to stop relying on the computer to help you solve a problem.

You might like to try another similar problem, using the same program:-

'Four batches of wire are held in stock, the price per yard for each batch being a whole number of pence, and the quantities being: A: 12 miles 1167 yards B: 16 miles 1233 yards C: 14 miles 775 yards D: 12 miles 1604 yards

The total value is £7758.04: what are the prices per yard?

The Spectrum and SAM will accept such inputs as 12 * 1760 + 1167, which makes life much easier.

BACK TO FRONT

Problems of this kind are created by working backwards, starting with the selection of suitable constants and then working out the total. The

difficulty of the problem lies in the need to reverse the process. Computers are willing enough to evaluate an expression and set the result in a variable, but they are not usually designed to work out the value of a variable embedded in an expression which is equated to a constant. A request to calculate B from the relationship $9*B=54$ will be rejected until the equation is recast as $B=54/9$.

Bearing that in mind, how would you persuade a computer to deal with the following problem:-

'A tube train leaves central London and stops at six stations before reaching the terminus. At the first stop, half the passengers get off and six get on. At the second stop half the passengers get off and five get on. This continues, one passenger less boarding the train at each station, after half the previous passengers have left, until the terminus is reached with five passengers. How many were there aboard when the train left central London?'

Solutions which involve trying different answers until one fits should not be considered acceptable. That dodges the issue. However, it should be said that the program which will be offered next month is not fully universal, though it does illustrate the necessary principles.

It will be noted that the problems examined in this series have been strictly mathematical, no word problems being considered. This, in a sense, contradicts the idea that a computer is no more than a super-calculator where the numbers are concerned, whereas it has a unique ability to handle text. A partial truth, perhaps, this idea bears thinking about.

Its weakness lies in the fact that any general work on the manipulation of text entails a fairly widespread vocabulary as a working basis. Processing text that has been provided by the user is no problem, but

checking the spelling calls for a fairly large dictionary, preferably one which will grow as it learns the literary habits of its user. Given such a dictionary, it might be possible to teach a computer to solve crossword puzzles, but there is no intention of tackling that project in this series!

A partial solution to the problem of handling text is conversion of the words to symbolic form, and this will figure in a future article (if the Editor will continue to give me space that is). It works by reducing the size of the 'dictionary' to more manageable proportions.

Until next month, happy problem solving.

+ * + * + *

Continued from page 28.

program justice, so it is good to know that it is not the final version. It deserves a good handbook which helps the user to get the full benefit of a very complex and versatile program. If you already have THE SOUND MACHINE you need this one too. It is like an advanced version, but with a more convenient notation, letting you take full advantage of Sam's stereo capabilities.

If you don't have THE SOUND MACHINE, then you would need to know a good deal about music and a fair bit about producing sounds and music on Sam to get the best out of ETRACKER. It is not a beginner's program, so if terms like envelope, frequency variation, channel and stereo field are a mystery to you, get THE SOUND MACHINE first. But sooner or later, if you are interested in making serious music with Sam, or want to embellish the games and programs you write with professional quality music and sounds, you will want to get ETRACKER.

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A UTILITY FOR DISCIPLE, PLUS D and SAM

By:- Leonard Baumann.

It can sometimes be irritating to have a disc which is full of gaps in the CAT. I have not as yet seen a program that will close up the file entries so I have had to write my own. Although I have often contributed short items to your SHORT SPOT feature I have not tried my hand at sending you a full Article. I thought it was about time I did and share the results of my efforts with other readers. The program given will close these gaps in the directory permanently. It was written for a Spectrum 48k fitted with a PLUS D, it will of course run on a DISCIPLE and with only minor amendments on SAM.

The details of all the Files on a Disc are held in the first 4 tracks consisting of 40 sectors of 512 bytes each. Each sector holds 2 Files in 256 bytes each.

The procedure is that the whole of the directory is loaded into memory from address 40000 onwards. Gaps are filled by bringing forward live file entries (groups of 256 bytes) and then the surplus slots are "nullified" by removing all the residual data. Finally the re-arranged information is loaded back into the directory area on disc.

The program is structured as follows:-

Lines 10-120 load the Directory into addresses 40000 to 60480, count the Files and the Slots and report the results. Note that it is assumed no Filename starts with a CHR\$ 0.

Line 60 PEEK (q+1) - treats such a CHR\$ 0 as meaning there are no further slots containing information. If Beta Dos is being used Lines 35,36 & 37 can be deleted and line 30 activated by removing the first REM in the line.

Lines 200-250 search for the first vacant slot to be filled.

Lines 300-360 carry forward the live files - closing the gaps.

Lines 400-440 nullify all the unrequired slots (including any previously ERASED slots which were held beyond the last file that showed on a CAT).

Lines 500-560 LOAD the new file data back into the directory and do a Cat to show the result.

Details of progress are shown on the screen whilst the program is running.

It is suggested that initially the program should not be applied to any valuable disc but tried first on a copy of a disc. It is very easy to make a mistake when copying in the Program - the Directory could be spoiled and be unrecoverable. As a safety measure the program can be stopped by entering "Line 130 STOP". At this point the original Directory details will all be in RAM and can be saved as a separate File with SAVE d1 "Directory" CODE 40000,20480. A spoilt directory can be restored by LOADING the saved CODE File into RAM and then Loading back into the Directory using the principles in lines 500 to 560 (leaving out Line 540)

```
10 CLEAR 39999
15 REM GAPCLOSE By L.G.Baumann.
20 PRINT INVERSE 1;"Loading From the
   Directory"
30 REM "LOAD @1,0,1,40000,40: REM Fo
   r Beta Dos in place of Lines 35,3
   6 & 37.
31 REM READ AT 1,t,s,h: REM Replace
   first part of line 36 for SAMDOS
35 LET h=40000: FOR t=0 TO 3: FOR s=
   1 TO 10
36 LOAD @1,t,s,h: LET h=h+512
```

```

37 NEXT s: NEXT t
40 LET oldfile=0: LET oldslot=0
50 FOR q=40000 TO 60479 STEP 256
60 IF PEEK q=0 AND PEEK (q+1)=0 THEN
    GOTO 90
70 LET oldslot=oldslot+1
80 IF NOT PEEK q=0 THEN LET oldfile=
    oldfile+1
90 NEXT q
100 PRINT "No of Files= ";oldfile
110 PRINT "No of Slots= ";oldslot
120 IF oldfile=oldslot THEN PRINT "There are no Gaps/Erased Files": STOP
200 PRINT : PRINT INVERSE 1;"Searching for the First Gap"
210 LET setA=40000: LET newfile=0
220 PRINT AT 16,0;"PROGRESS": PRINT
    "oldfile= ";oldfile: PRINT "newfile= ";newfile: PRINT "oldslot= ";
    oldslot: BEEP .1,30
230 IF NOT PEEK setA=0 THEN LET setA=
    setA+256: LET newfile=newfile+1:
    GOTO 220
240 IF PEEK setA=0 THEN GOTO 300
250 IF newfile=oldfile THEN PRINT AT
    18,9;newfile: GOTO 400
300 PRINT AT 6,0; INVERSE 1;"Bringing
    Remaining Files Forward"
310 LET setB=setA+256
320 IF newfile=oldfile THEN PRINT AT
    18,11;" ": GOTO 400
330 IF PEEK setB=0 AND newfile<oldfil
    e THEN LET setB=setB+256: GOTO 33
    0
340 LET setC=setB: FOR n=setA TO setA
    +255: POKE n,PEEK setC: LET setC=
    setC+1: NEXT n: LET newfile=newfi
    le+1
350 PRINT AT 18,9;newfile;AT 18,11;"<
    ": BEEP .1,33
360 LET setA=setA+256: LET setB=setB+
    256: GOTO 320
400 PRINT AT 8,0; INVERSE 1;"Nullifyi
    ng the remaining Slots"
410 LET clearing=newfile+1
420 IF clearing>oldslot THEN GOTO 500
430 PRINT AT 19,12;"--> clearing slot
    ";clearing: BEEP .2,37
440 LET setC=setA: FOR n=setC TO setC
    +255: POKE n,0: NEXT n: LET setA=
    setA+256: LET clearing=clearing+1
    : GOTO 420
500 PRINT AT 11,0; INVERSE 1;"Now re-
    SAVEing to the Directory"
510 LET q=40000: LET count=0
520 FOR t=0 TO 3: FOR s=1 TO 10
530 SAVE @1,t,s,q: REM use WRITE AT 1

```

```

,t,s,q for SAMDOS
540 ,t,s,q for SAMDOS
540 IF count>oldslot THEN PRINT AT 1
    3,3;"Finished - Will now CAT": BE
    EP 1,25: PAUSE 100: CAT 1: STOP
550 LET q=q+512: LET count=count+2
560 NEXT s: NEXT t: GOTO 540

```

It is also possible to test the re-arranged file entries before re-saving to the directory by adding at the beginning of Line 500 "GOTO 6000" and adding the following lines to the end of the main listing. This will do a mock CAT by reading from address 40000 to see that all is well.

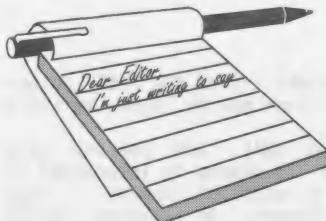
```

6000 CLS : PRINT "      TEST PROGRAM
    ME": REM A useful examination
    before re-saving the Directory
6010 LET t=1
6020 FOR q=40000 TO 60479 STEP 256
6030 LET n$="": FOR n=q+1 TO q+10: LET
    n$=n$+CHR$ PEEK n: NEXT n
6040 PRINT t;" ";n$:TAB 14;(PEEK (q+11
    )+256*PEEK (q+12))/256:TAB 19;"Fi
    le Type ";PEEK q
6050 LET t=t+1
6060 NEXT q: STOP

```

As a final thought it would be nice if some kind reader could translate the program into machine code as was done once with the "Cat-Sort" program published many months ago. It would shorten the running time.





YOUR LETTERS

Dear Editor,

Re the S&SC/FORMAT changeover.

My local Trading Standards Office has now confirmed they are of the opinion that the transfer from S&SC to FORMAT issues on a one to one issue basis could well be in breach of contract.

The reasoning is that the S&SC subs were £16.20 for 12 months but FORMAT is available at £12 for 12 issues. Therefore the reader is getting a cheaper product than was paid for.

It was suggested that the reader could well be due compensation in this respect (or alternatively I consider FORMAT should convert on an outstanding subscription VALUE not issue basis).

Lets put it another way, you go into Currys and hand over £30 for a tape player. Currys then say "we have decided not to sell players any more. Go next door to Dixons and they will give you one of their £20 models."

Obviously the actual value will depend upon number of subs outstanding.

Worcester Trading Office is awaiting response to above points re difference in subs value for what was paid against what is received.

Yours sincerely, Malcolm Perry.

Normally when someone writes us a letter, and clearly marks it "Not For Publication" (as this one was), I would respect their request. Still in this instance I felt that a reply was really necessary. Mr Perry has, over the last few years, constantly bombarded us with letters on a whole range of moans (several of which have been aired in past issues. Despite numerous requests over the years he has constantly proved unwilling to phone us to discuss matters.

I know I've said it before, but replying to letters is just too costly

for us (except to overseas members of course, who can't use the hot-line). On the phone you can have two-way communication, questions and answers. If one of our members who is profoundly deaf can still manage to ring us I do not think it unreasonable for Mr Perry to do the same. Instead he just carries on writing letters.

Now, due to Mr Perry's past actions, which cost us dearly in time and effort, I'm left with no alternative but to reply in print. I apologize to other readers for taking up so much space in YOUR LETTERS but I also think this subject deserves a public forum.

Frankly Mr Perry, your example is ludicrous so I will just ignore it. Your contract with Garner Designs was for X number of magazines. Your S&SC subscription was, along with many others, converted to issues of FORMAT. You paid for X number of issues. You had Y number outstanding. We agreed to supply Y issues of FORMAT. The price paid therefore has nothing at all to do with the matter. Now first, FORMAT is a superior product - why else would we have had ten times the number of subscribers as S&SC? Secondly FORMAT is published monthly unlike S&SC's very irregular appearance. And, finally, FORMAT is still being published....

Our choice was simple. Allow S&SC readers to suffer by having no magazine to read and then having to go to the expense of persuading Garner Designs through the small claims court (with little if any chance of success). Or to be the good guys and help people out. We prefer to be the Good Samaritans.

We acquired very little from Garner Designs (apart from a headache) except a list of 300+ people, most of whom had only purchased a single issue or had no outstanding subscription left. I, and even more so Jenny, spent hours of time we could ill afford trying to

sort out matters. We made an offer to ex-S&SC readers that has met with universal approval (until your letter).

We have spoken in the past to Gloucester Trading Standards Office about this matter and they are happy with the way we have handled things.

What more do you expect from us - BLOOD!

I would value other readers comments. Ed.

Dear Editor,

Enclosed are my renewal form and payment. The reason for this letter is that I wish to order some back issues of FORMAT at the same time.

I notice that you no longer advertise DRAGON TILES. The only reason that I haven't considered purchasing this program is that the old description told me nothing about it, other than that it was a game. What type of game is it and is it still available?

I seem to remember that PBT Electronics used to advertise in FORMAT. I am trying to purchase their SAM Colour Dump Software for my Citizen Swift 24e printer. Do you know if they are still in business and if not does anyone know where I can obtain this software?

I already have Volume 3 numbers 1 to 6 but can only obtain the rest as a complete set (order enclosed). Do you know of anyone who would be interested in these issues at a reduced price of 75p each. Could you advertise them for me in SMALL ADS? if so thanks!

Finally I would like to say how much I enjoy FORMAT. I receive a great many computer magazines, both trade and public, FORMAT is the only one that I open and read the moment I receive it. Thanks for a very entertaining publication without which I am sure that both the Spectrum and the SAM Coupe would not have lasted as they have.

Yours sincerely, Robert Young.

Sorry Robert, Dragon Tiles is now out of stock - in fact we have sold the rights to Revelation for use on a compendium pack of non-arcade games they plan to release later in the

year.

For availability of the PBT colour dump see last months issue, we still have some.

Sorry no SMALL ADS section this month but if anyone is interested in the first 6 issue of volume 3 then contact Robert on Reading (0734) 834679.

And thanks for your comments on FORMAT - I think my head will still fit through the office door, but only just. Ed.

Dear Editor,

As part of my Higher Computing Studies I am conducting an investigation into computer entertainments. I would be grateful if you would help me with this by answering the following questions:

1. In your opinion, what factors have caused software producers (including yourself) to continue to develop from the early dedicated consoles through to newer developments such as virtual reality?

2. Do you believe that computer entertainment systems have an adverse effect of the health of the users?

3. In your opinion, has the recent rise in popularity of consoles had an effect on the social behavior of users? For example, does the violent nature of some games either release or encourage violent behavior; and have users become more insular or do they discuss and share games with friends?

I would also be extremely grateful if you could help me with my investigation in any other way, for example by giving me information about the history of your company.

Thank you very much for your time.

Yours faithfully, Colin Borland.

1. I would not develop software for any games consol.

2. Well.....

3. Yes, No, Oh my head hurts.

Seriously though. DON'T - what ever you do - lump computers with video games consols.

Games playing can relieve tensions; frustrations; and yes even violent tendencies. But consols stop there.

You just play what games some high-and-mighty manufacture allows you to have access to.

Computers on the other hand allow you to explore and expand your horizons. You can play other peoples games, but you can also write your own. Even when playing other peoples the choice of companies to buy from, and the price levels of products, is far wider. Also, of course, computers go way beyond just playing games. When Ninsegahave word-processors and Spreadsheets available I might just be prepared to look at them in a different light.

Having said all that, its time for our readers to have their say. Come on readers - Colin is waiting for your views. Any I don't publish will be sent on to him. Ed.

Dear Editor,

First, I would like to take this opportunity, to thank all of you at INDUG for producing a highly informative and interesting read.

Thank you for supporting the Spectrum and SAM computer range. In a time when Japanese consoles drown the market, you stand by the best of the British.

I have had a Sinclair since '86 and believe that there is a new era approaching for these computers, they are no longer in the 'mainstream' market, but have an ever strong enthusiast niche of their own. Now that companies had lost the competition of the 'Biggies' they can produce quality software for SAM and Spectrum on their own terms.

Yours Thankfully, Kevin Bennett.

Dear Editor,

I have heard a rumor that you will be supplying a digitiser for the SAM in the near future. Before SAM went bust the last time I ordered and paid for the digitiser that they were supposed to produce. I never did receive it and my money went down the drain. So I would be very interested to know if and when and how much. I am an old age pensioner so I shall have to start saving as soon as I know what the cost will be.

I would like to take this opportunity to thank you for FORMAT, which I have received since issue number one. I must say I look forward eagerly to its arrival every month.

Yours sincerely, Cliff Redknap.

Not us Cliff, but West Coast Computers. SAMCO had planned a video digitiser but as you say that was cut off by their collapse, no WCC are working on a new version but I doubt this will be ready until quite late in the year. Still I promise to let you know as soon as more details become available.

It may interest some readers to know that WCC are also working on a self-contained modem and that should be out before the summer. Ed.

Dear Editor,

In this envelope should be my renewal, the first of many! As it's the first, I can't say anything about the past quality of FORMAT but certainly the only mag that comes near to the standard of FORMAT is Fred, which is differently orientated. So, FORMAT is the best in its field that I know of!

Now, something that has been bugging me for a long time. Those of you who have ever used an Amoeba will know what I mean when I say "why do they put up with the access times!" A friend has got one, and I watched him load up a demo. First, he put the disc in and selected which program he wanted. About a minute later (literally!), it came up - and it was only a demo! I've seen Wing Commander on it as well (that was one of his favorite games). The 3D graphics weren't anything to write home about, it took about 2 minutes to load up, and half of the screens were simply still images! But enough about Amoebas, at least they're a computer (although Megadrives aren't too bad, but I wouldn't swap my SAM)!

Does anyone know where I can get Prince of Persia from? Nowhere stocks it for the SAM that I have seen. Is there a chess program available for the SAM? At the moment I'm having to play on a (shock, horror!) PC.

Speaking of which, why can you get things like PKZIP etc., for them and not the SAM? Oh well ...

Sorry for burbling on! Hello to S.M.S.Kempees, without whom my life would be that much duller, and my SAM would pine! And Pat Spencer - write back, perlease!

Do you know anywhere where I can get a SCART cable, MIDI leads etc? Secondly, do you know if I will need a sequencer to run a keyboard (assuming I've got the leads, of course!) from Sound Machine, and if so, where can I get one from?

Are you still planning that games supplement? If so, I've got a load of type-in Multiface pokes I could tell you. Are the books still on the cards? (You know, the Advanced Flash Users Guide from Carol Brooksbank, and so on) If so, I'd buy the Flash Guide, and possibly also the Basic Book.

Could you also send a sample issue, or at least something letting him know you exist, to my uncle, who's just got a SAM.

Hope you, Jenny and all the contributors can keep up the good work! (See, Marc Richards, other people can do cliches too!)

Yours sincerely, Paul Walker.

Now, now, Paul. Remember, we ask for short letters - not life stories - do be a little (lot) more concise in future.

Thanks for the comments on FORMAT. If anyone offers a Rolls Royce for your SAM take it and I will exchange it for two brand new SAMs for you. P.O.P. is not available now although you may be able to get one at a show. Chess is coming (I hope). What would you want PKZIP for? Hello Mr Kempees how's The Netherlands? Scart and midi and all other cables from Blue Alpha. No the Sound Machine uses SAM's own sound chip. Yes, and with the demise of SU there is a need for one - but I need an editor to run it. More on the books later this year - deals being done. Details on the way to lucky uncle with SAM, now get your Great Aunt to buy one as well. Ed.

Dear Editor,

Having read the March edition of FORMAT and received my renewal notice, I would like to take this opportunity to express my opinion on the contents of FORMAT. In answer to the questions on the renewal form, are that I can't really distinguish between the three articles that I enjoyed the most or the three that I least enjoyed, because I find them all equally as enjoyable. As for what I would like to see more of in FORMAT. I would like to see more hardware related articles and more programming languages other than BASIC and Assemble. If you are serious about finding out what people want to read in FORMAT, why not include a questionnaire or readers survey in an edition like some of the more expensive PC magazines do.

While I am writing I have a grumble about the SAM. It's about storage capacity of the disc drives. Having been spoilt rotten for storage capacity on my other computer and IBM PC compatible with a 90 mega byte hard drive. I find 780k a bit small and I quite frequently misplace discs that I am using. I was wondering whether anyone is considering producing a hard disc for the SAM, about 30 mega byte would do nicely.

Yours sincerely, Richard Popplewell.

Judging from the vast amounts of space programs take up on a PC (the latest version of Corel Draw needs 20mb) I'm not surprised you need so much space. However SAM is a little different - programs are written in a much more sensible way and as a result the 800k discs are not such a limitation. That said, oh boy what I wouldn't give for a hard drive. We all live in hopes.

* - * - * - * - * - *

Letters may be shortened or edited to fit on these pages.

This is YOUR letters page so it is up to you, our readers, to fill it. Keep letters as short as you can so we can fit in as many as possible.

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